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GROSS OPHTHALMOLOGICAL FINDINGS IN TWELVE HUNDRED AND FIFTY-NINE PATIENTS AT THE CENTRAL OKLAHOMA STATE HOSPITAL, WITH OTHER NOTATIONS

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For sometime it has been felt that we have been neglecting a rather important field in that we have not made as careful an examination of incoming patients as we might as this relates to the eyes, the accessory sinuses, the nose, throat and teeth. The examination of the eyes chronicled here is a step in the direction of obtaining information which might be of value in diagnosis as well as in treatment. This report is not meant to be an extensive study as time would not permit. It has been more in the way of an effort to orientate ourselves as to the present status of our patients in respect particularly to the eyes.

Conditions which were expected to be prominent have not been found so and others have been more frequently found than had been expected. In the epileptic patient, for instance, due to the terrific intraocular strain supposed to be present, and from the fact that a great many have paralysis, it had been expected to find a great many hemorrhagic areas and other evidences of pressure. Such seemed not the case, as the incidence does not seem to be above that for all patients of corresponding age. Also considering the rather large number of neurosyphilitic patients and the intensive treatment to which quite a few are subjected, a larger number might have been expected to show either disease pathology or pathology due to the purported and reported influences of the arsenicals on the eye structure.

A short discussion of some of the phases under several groupings will be made. The fundus was considered normal when it could be seen distinctly and no pathology of the intraocular system could be noted by a view which covered as much of the fundus as possible.

Haziness of the cornea, or lenticular or vitreous obstruction occasionally prevented perfect sight of the retina, and in such cases the actual condition was tabulated and the fundus was not registered as normal, although it might have been. The retinal findings are probably the most difficult to interpret, because of the closely interwoven association with the choroid. In those cases in which the changes were in front of or among the retinal vessels it was safe to assume that a retinal change had occurred. But when the condition was of long standing and color changes were marked, it was at times doubtful as to whether or not it was due to old hemorrhage or to choroid disturbances. The terms used in the tabulation are more or less descriptive. The word "flash" occurs in the literature and refers to a condition in which the elements are arranged as if they had been scattered by a flash or splash.

The choroid was considered the seat of the pathology in practically every case in which a dark, especially a solid dark color, was dominant, or in which the retinal vessels were distinctly to the fore.

In many cases in which a faulty view, or no view at all was to be had of the fundus, the cornea was found to be at fault, presenting various lesions, such as haziness, or leucomas. Arcus senilis is present more frequently than the tabulation indicates, the insufficient light preventing a discovery of all but the more apparent cases.

Some inflammation of the conjunctivae was found in a few cases. The old trachomatous cases, if they could properly be classified as conjunctival disturbances, are discussed under the classification of the lids.

The examiner was impressed by the large number of cases in which there was a tortuosity of the retinal arteries, one or more. Those which are recorded as tortu-

ous seemed to the examiner to warrant the characterization, abnormal, although there has been quite a bit of discussion as to the significance of these arterial aberations and meanderings. Marcus Gunn believed that "undue tortuosity of the vessels is not significant unless associated with other evidence of disease", while DeSchweinitz gives undue tortuosity as one of the alterations in the retinal vessels caused by chronic nephritis and general arterio sclerosis. It seems that an early diagnosis of cerebral arterial tension or sclerosis is desirable, from the fact that we have quite a number of apoplectic patients showing up at an early age, and in whom under the routine examination, no sufficient pathology is found to put us on guard. A condition which seemed more than a coincidence was, that in every case in which old hemorrhagic areas were present, there was either moderate or marked tortuosity of one or more retinal vessels in the neighborhood of the hemorrhage.

The pupils were tabulated as irregular, unequal and undilated. Their condition had been noted before examination, and as a mydriatic had been used, it is evident that only the irregularity of the pupil should be considered pathologic as there might have been uncertainity about the administration or action of the mydriatic which could account for the inequalities or the failure to dilate.

Mild to cataractous changes in the lenses were noted, the former in sixty-three eyes, the latter in twenty. Of course the larger number were observed in the elderly patients. Some of these could very well be operated upon to advantage.

The number of cases showing lesions of the iris were negligible as to number, but two presented interesting features.

Only one synechium was found, this of the posterior type. It is possible that adhesions of the lens to the iris could have been responsible for some of the failures of the pupil to dilate.

Opacities in the vitreous, either stationary or floating, were not as numerous as one might expect to find, and there is of course the likelihood that some were not detected.

Some of the conditions of the optic nerve as tabulated are not pathological, but were mentioned so that later observations might be made if it were desired. Not as many cases of choked disc were found as expected and the ones found were not prominent. Atrophy or beginning atrophy was in just about the same percentage.

Not enough time was given to each examination to determine the exact condition in the aqueous chambers, but one or two cases were interesting and one is here presented.

Under the head of muscular disturbances, the squints have been placed, although there is room for debate of such a classification. Worth in his monograph on squint, very strongly favors the view that most divergencies are due to faulty fusion sense in the brain and not to muscular imbalance or even to refractive errors, both of which conditions, either singly or combined, have been given credit for the deviations, excepting of course, the frank organic lesions

Blindness believed to have been caused by disease was found in seven eyes. Injury was the cause assigned in six.

Nystagmus is noted in only one case, but careful search will reveal another case or two I am confident.

A few conditions of the lids were found, but by no means does the table show the total number here, but rather, tends to emphasize the value of a systematic and thorough examination of the incoming patient. Old trachomatous lesions possibly account for more everted lids than any other one thing, but I have hesitated in classifying any as trachoma, because I feel that that is a hazardous diagnosis without it is thoroughly worked out.

Myopia of such degree as to make the fundus indistinct without the use of several diopters of minus correction were considered. No effort was made to get the exact correction.

Some other conditions are named, few in number, and possibly not representing the entire number of cases of each here.

A rather large number of patients showed such lack of cooperation that a reasonably satisfactory examination was not possible. This class of eighty is not included in the twelve hundred and fifty-nine cases.

RECAPITULATION

Twelve hundred and fifty-nine patients were recently examined with the ophthalmoscope, in practically all cases, following a mydriatic. The object was primarily for the purpose of making a survey of eye

conditions which might be of advantage in diagnosis or treatment.

Expected conditions have not been so numerous, while less expected conditions have been frequently found.

Undue tortuosity of the retinal arteries and its incidence among young and middle aged patients was especially noticeable. Most available opinion holds that this condition is not of particular value as evidence of arteriosclerosis or hypertension.

		O.D	O.S.
1.	Fundus Normal—	964	940
2.	Retina—		
	Flash	2	1
	Gray Infiltration	4	4
	Edema	24	30
	Spots	2	3
	Atrophy		1
	Plaque		1
	Inflammation	17	9
	Albuminuric Retinitis	1	1
3.	Choroid—		
	Spots	3	4
	Hemorrhagic areas	13	3
	Phys. Increase	1	
4.	Cornea—		
	Marked Astygmatism	1	
	Haziness	8	9
	Arcus Senilis	9	9
	Leucoma	7	9
	Keratoconus		1
	Ulcers	1	
5.	Conjunctiva—		
	Inflammation	2	1
	Pterygium	9	7
6.	Vascular—		
	Angioid streaks	1	
	Anomalies	7	7
	Slight tortuosity	89	105
	Moderate tortuosity	12	12
	Marked tortuosity	12	15
	Compressions of veins	7	7
	Atrophy of vessels	1	1
	Very small aneurysm	1	
	Enlarged veins	3	1
7.	Pupils—		
	Irregular	4	1
	Unequal	2	2
	Not dilated	5	2
8.	Lens—		
	Changes	28	35
	Posterior synechia		1
	Cataract	13	7
9.	Iris—		
	Coloboma		1
	Iridiremia		1
10.	Vitreous—		
	Opacities		4
	Floaters		2
11.	Optic Nerve—		
	Bright	1	
	Fullness	1	1
	Inflammation	2	1
	Eliptoid	2	2
	Papilledema	1	
	Atrophy	4	4
	Choked disc	2	4
	Physiological cupping	7	8
	Irregular	3	4
	Indistinct	7	8
12.	Aqueous Chambers—		
	Anterior deep	1	1
	Tremulous	1	1
13.	Muscles—		
	Internal squint	2	5
	External squint	5	3
	Concomitant squint	6	5
14.	Amaurosis—		
	Injury	2	4
	Disease	6	1
15.	Nystagmus—	1	
16.	Lids—		
	Trachoma	1	1
	Chalazion	1	1
	Inverted	1	1
	Everted	1	1
	Injury	2	1
17.	Other conditions—		
	Undeveloped	1	
	Hypertension	1	1
	Color pink	2	2
	No cooperation	80	80
	Myopia high degree	10	4

RECURRENT RETINAL HEMORRHAGE*

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While the topic for discussion is *recurrent* retinal hemorrhage, it is necessary to consider the subject of retinal hemorrhage as a whole. There is no distinct line of demarkation as far as etiology is concerned..

We are able to classify only as to location, depth in the tissue and to give in many instances the associated general diseases, but as to the exact etiological factor, we are as yet unable to understand clearly the cause of retinal hemorrhage.

The classification of Foster Moore on etiology of retinal hemorrhage is, I think a good one as it briefly covers the pathological conditions of the body that we find associated with hemorrhages in the retina.

1. Diseases of metabolism
   Renal disease
   Diabetes
   Scurvy
2. Diseases of the haematopoietic system
   Arteriosclerosis
   Severe anemias

*Read before Annual Meeting Oklahoma State Medical Association, Oklahoma City, May 24, 1929.

Leukemia
Infective endocarditis
Vaquez's disease
Hemophilia

3. Obstruction of the venous outflow
Thrombosis of the central veins
Thrombosis of the cavernous sinus
Subarachnoid hemorrhage
Papilloedema
During birth

To these we must add syphilis, tuberculosis and focal infection.

These various diseases will not be discussed for they are all familiar to you, neither will it be necessary to enter discussion as to differentiation of the various types of hemorrhages.

Just why we have retinal hemorrhages in some cases and do not in others of apparently similar fundi is not clear.

What happens to the vessel at the time of bleeding, is it a rupture of the vessel wall, a passage of the blood constituents through temporarily injured wall or both? In the larger hemorrhages, of course, it is apparent that there has been a rupture and probably in a vessel of some size, although the exact location and vessel involved may not be found and in most instances is not.

Kroh has shown that the capillaries are not cabable of passive dilitation or narrowing but that contractile cells (Rouget cells) surround the vessels and that these are under control of the nervous system making possible contraction and dilitation of the vessels. He shows by experiment that the vessel is impervious to the passage of foreign substance many times smaller than red blood cells while at the same time there is a free interchange of the fluid constituents from vessel to tissue and vice versa. The cells do not under normal conditions pass out into the tissues.

That there is some toxin circulating in the blood stream which interferes with the integrity of the vessel wall causing a passage of the cells into the tissues or a rupture in the vessel is probable. That the toxin is not the same in every case is taken for granted.

One of the most interesting types of retinal hemorrhage and one that differs in many respects from others, is recurrent retinal hemorrhage. This, in practically all cases reported, comes in young male adults.

Just why we have this predispcsition to spontaneous hemorrhage into the retina in young men is not known, it is a fact, however, that it seldom occurs in women.

It was first described by Von Graefe in 1854.

In 1880, Eales described the symptoms and course of recurrent retinal hemorrhage, his cases occuring in males between the ages of fourteen and twenty, and most of these cases gave a history of epistaxis. Panas mentioned the condition as ocular epistaxis.

The hemorrhages come on suddenly in fundi of apparently normal subjects, the patients, in many cases, are strong, robust and active and in whom we are unable to find any definite causative factor. The hemorrhages may be single massive ones or repeated many times at short intervals until the eye in many instances is lost.

Blood pressure does not seem to have any influence in the production of this type of hemorrhage, some of the worst cases coming in patients with a normal or even low blood pressure. Exercise apparently has no bearing, as these patients may have the first hemorrhage when quiet, or, on being put to bed after the first attack will have repeated hemorrhages. Ocular tension is thought not to influence, neither does hemophilia appear to be a direct cause.

Some endocrine dysfunction may be a contributing factor and this might account for the preponderence of cases in males.

Syphilis must be considered, but in most cases it is not found.

It is highly possible that focal infection may play a part in the production, but if so, the absence of involvement elsewhere in the body would suggest that it be an infection to which the eye is peculiarly susceptible.

Noll, in 1908, was the first to suggest tuberculosis of the retinal vessels as a cause of this type of hemorrhage.

Finoff, in 1912, in an article says: "Tuberculosis of the retinal vessels is a common cause", and thinks the veins are particularly involved. He reported several cases in which the patient either had an active tuberculosis or a positive focal reaction in the eye. Many other writers have reported cases that were due to tuberculosis and many have cleared up or improved under tubercular treatment. Many

of these cases were patients in whom no active lesion had been found elsewhere.

Our late statistics tell us that tuberculosis is twice as prevalent in young women as in men. If this be true, it would seem reasonable to suppose that if this type hemorrhage be due to tuberculosis that we would find it as often or more so in young men.

That the etiology is not clear is evident when one sees so many possible causes mentioned by various writers.

The prognosis, in this class of cases, is poor, both eyes often being involved and vision markedly diminished, the hemorrhages may continue over long periods of time and treatment in most cases is unsatisfactory.

Having recently seen two cases of recurrent retinal hemorrhage, both in young men, for which no cause could be found, it occurred to me that it would be an interesting subject to bring before the section, mainly for the discussion it might bring out.

CASE REPORTS

Paul, V. C., white, male, age 32, was first seen September 25, 1927, at which time he complained of slight blurring of vision in right eye.

Family history negative, both parents living and well. Has three brothers and two sisters, all living and well.

Past History: Had measles at age 6, no other diseases of childhood, he has always been well. Tonsils removed in 1918, while in the army, at which time he had slight arthritis in ankles. In 1925, had a recurrence of the arthritis lasting three weeks; there was slight swelling of ankles at this time. Since that time has had no illness of any kind.

Present Illness: On August 16, 1927, while going home after an unusually hard day's work, noticed slight blurring in right eye, vision however, he says was good, was not examined at that time.

Patient first consulted me on September 25, 1927, thinking he needed glasses. Vision was 20-20 right and left, external examination negative, tension normal, media clear and fundus examination negative. Vision fields were normal for form and color. No scotomata. No furthur examination was made at that time.

November 26th, while attending a football game he had a sudden loss of vision in the right eye. I saw him on November 27 with findings as follows:

Right eye pupil normal, tension normal, large hemorrhage into the retina and vitreous. It was impossible to see clearly, the fundus, but it was thought that a detachment of the retina could be made out in the lower part. Vision was limited to counting fingers at three feet.

Left eye was carefully searched for pathology, but none was found.

Vision in left eye 20-20.

He was given careful general examination.

Skin and mucus membrane normal, head and neck normal, no enlargement of thyroid, nose and throat and teeth negative, tonsils were removed, chest negative. Heart: pulse rate slightly rapid, no thrills, no murmurs.

Blood pressure systolic 122, diastolic 84. Abdomen negative, stomach negative, urine, blood and blood Wassermann tests negative, genitalia negative, no scars or discharge, no history of venereal disease or luetic infection. Rectum negative, the coagulation time was normal.

He was examined again in February, 1928. The right eye was about the same. The fundus could be seen, but not clearly, and a detachment of retina was present in lower part.

Left eye showed at this time slight dilitations and irregularities along branches of superior temporal retinal artery, there was a mild neuroretinitis and several small retinal and sub-retinal hemorrhages.

March 13th, he was examined at Mayo Clinic with findings practically identical with the above, both as to pathology in fundus and negative general examination.

The only questionable pathology was suspected mild non-venereal prostate infection. He returned home and was examined by Dr. Rex Bolend with a view to treatment of prostate. Dr. Bolend reported a negative prostate.

On August 8th, 1928, he had a retinal hemorrhage in left eye with vision recorded as 6-20. He returned to Mayo Clinic where he remained until October 31st. He had, while there, more than thirty hemorrhages in the left eye. During this time he was repeatedly examined for possible

cause, but none found. In fact there was no pathology to be found outside of the eye.

He was kept in bed and absolutely quiet. Was given injections of gold sodium theo sulphate, 5 to 7 day intervals, from August 10th to October 30th. Six injections of raw milk were given in the buttox. One injection of forty million typhoid bacilli into the vein and this was followed by six hemorrhages in rapid succession.

Treatment was discontinued and he has had no treatment except rest and avoidance of the use of eyes. He has had no hemorrhages since returning home and is in the best of health except for the poor vision.

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COMPLICATIONS OF ACUTE MASTOIDITIS

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To make an attempt to take up the subject of the complications of acute mastoiditis, with any degree of thoroughness in a short paper is almost impossible.

SYMPTOMS

One should assume that he is dealing with the average operated case. The vein may or may not have been exposed; there may or may not have been a perisinus abscess. The first day after the operation, the temperature has been high, perhaps 103 degrees or 104 degrees F., and then has gradually returned to normal. The patient looks well and feels well. The wound is in good condition. Suddenly the temperature rises again to 104 degrees F., or higher.

The temperature often is accompanied by a distinct chill, but in certain cases there is only a chilly sensation or there may be no signs of chill at all. The most striking feature of the temperature is that, although the patient is considerably prostrated, he has a feeling of well being. He cannot believe that he is seriously ill. The following morning the temperature goes down to normal or nearly normal and then rises again in the evening to the same height or even higher.

Some patients have been known to run a temperature as high as 107 degrees F. and eventually get well. The patient may complain of a thick feeling in the neck on the affected side and palpation may show that the muscles are taut and that some of the cervical glands have enlarged. Such signs may be an indication that the thrombus is spreading rapidly down into the jugular vein. If the intermittent temperature is allowed to continue for any length of time, the patient, naturally, will become considerably prostrated and at any time may develop infections of a serious nature in other parts of the body due to the lodgment of infected thrombi.

No definite diagnosis of a sinus thrombosis should be made until every means, both clinical and bacteriological, are used to establish the condition without doubt and until every other condition, such for example, as bronchopneumonia and pyelitis are eliminated. There may be no harm in reopening an operated mastoid wound, but, as this usually has to be done under a general anaesthetic, it certainly does not favor the patient. Moreover, many a sinus has been opened up at such a second operation, found to be normal and an infection of it has taken place as the result of this second operation. Not all patients who run intermittent temperatures, in connection with acute mastoiditis, operated or not operated, have sinus thrombosis, as has been proved in any number of instances in which the patients have gotten well without any operation whatsoever, other than the simple mastoid operation.

Among the chief symptoms of importance in thrombosis of the sigmoid sinus are: vomiting, headache, intermittent temperature, chills or chilly sensations, a positive blood culture, an increased blood count and objective evidence in the vein itself, with mild cerebral and meningeal signs of irritation.

TEMPERATURE

As has been stated in the previous paragraph, the temperature usually rises suddenly to 104 degrees F., or over, (and the vein or a perisinus abscess was observed) a suspicion of sinus infection may be felt, if this temperature begins after the tenth day. In a number of instances, patients have been perfectly well until that time and no apprehension was felt. In certain cases, patients were ready to leave the hospital. Then suddenly, without any parti-

cular reason that could be assigned, the temperature suddenly rose with a chill, and an infection of the sinus was found.

Unfortunately, in a number of cases, the temperature is not typical. The patients, from the time of operation or soon after it, run an irregular temperature for which no definite symptoms are accountable. The wound may show signs of excessive suppuration and may have to be re-opened if it was closed at the time of the original operation. The temperature may never rise above 102 degrees or 103 degrees F., and one will have to depend upon other symptoms to establish the diagnosis. As a rule, such patients do not show very good resistance; or the contrary may be the case and the organism causing the infection may be very virulent. There are seldom any chills or chilly sensations and the patient feels very well except at the time that the rise in temperature occurs. Numerous blood cultures may be negative and it is only after a prolongation of the symptoms, beyond a reasonable length of time, that one feels that an exploratory operation is necessary. On opening up the mastoid and exposing the vein, the surgeon is frequently surprised to find that it is completely thrombosed, sometimes even down beyond the jugular bulb. In fact the thrombus may be so firm that it has kept bacteria from escaping into the blood stream.

CHILLS OR CHILLY SENSATION

If the rise in temperature is accompanied by a chill or chilly sensation, there is evidence that there is a bacterial invasion which presumably has come from an infection of the sinus. The chills vary greatly in their intensity and in the time that they last. Some chills last as long as half an hour and are so severe that the patient's teeth chatter and the bed shakes. At other times, they are so mild that they are hardly discernible to the patient. The chill is often repeated with every rise in temperature, but this is not necessarily so. The patient is usually in a burning fever at the time of the chill, and when it is over, is covered with a profuse sweat which soaks his night clothes. There is often severe prostration at the time of the chill.

THE VALUE OF BLOOD CULTURE

The increased and more accurate facilities of the laboratory have made it possible for otologists to place more reliance on the findings of the bacteriologist. There can be no better evidence than in the taking and culturing of the blood. There have been various controversies in the past (and some of these are still going on) as to whether a culture of the blood must always be positive to establish a diagnosis of sinus thrombosis. Leaving this matter aside for the moment, one may state that it is almost axiomatic that a positive culture of the blood, in connection with acute mastoiditis, in which there is associated an irregular temperature, with or without chills, is an indication of an infected or thrombosed vein which should be operated upon as soon as possible. In other words, a positive blood culture means trouble, while a negative culture does not mean there is no trouble. In the event of a negative blood culture, other cultures will have to be taken at regular intervals, preferably at the time when the temperature is at its height.

Drs. Arthur B. Duel and Jonathan Wright report 57 cases treated in the Manhattan Eye and Ear Hospital in which careful blood examinations were made; of the 57 cases a positive bacteriemia was found in 16. Of the 16 positive blood cultures, streptococci was present in 14, pneumococci in 2.

THE VALUE OF THE BLOOD COUNT

The blood count must be analyzed in conjunction with the other symptoms. As soon as the temperature has begun to rise, a blood count should be made, and, for comparative purposes, it should be made every day thereafter. In the general run of cases of thrombosis of the sigmoid sinus, the white blood cells seldom increase to over 18,000 but the relative number of polymorphonuclear leucocytes is invariably increased. The percentage may be as high as 85 or 90. If the count be above 18,000, one should look elsewhere for trouble although exceptions always occur. The great value of the count is in those cases where it shows a tendency to be below the normal. This may mean a lowered resistance on the part of the patient, but, as a rule, it means that the temperature is not caused by an extension of the infection from the mastoid wound. It may indicate an intercurrent malaria or typhoid fever or one of those fevers of the protein type.

One should not forget that there are other conditions than sinus thrombosis which may complicate a mastoid condition and produce chills and fever. Among the

chief of these are malaria and typhoid fever. But recently a condition known as protein fever has been described. The exact interpretation of this fever on a protein basis has not been established. What we do know is that a patient, after a mastoid operation, runs an irregular temperature, sometimes very high, which cannot be accounted for. After a few days or weeks, it spontaneously subsides. There is no proof of a so-called protein fever but the term may be used to account for a number of these cases which show no definite signs of vein involvement.

The case in point is that of a girl 16 years of age operated on by the author recently. At the time of the first examination both ears had been discharging profusely for 8 or 9 weeks, W.B.C. 27,600 with 87 differential, temperature 101. Roentgenological examination showed extensive destruction of the right mastoid region. Removing the necrosed bone at time of operation necessitated wide exposure of the sinus. Its appearance was blue, shining and pulsating. Two days after operation, the patient began to run a high temperature associated with chills. W.B.C. showed 5,000, differential 56, blood culture negative. Blood examination revealed the presence of malaria. In other words, although a high blood count may not mean that there is not sinus thrombosis, a low blood count, particularly if it be associated with a negative blood culture, is fairly good evidence that the sinus is not infected.

DIFFERENTIAL DIAGNOSIS

Sigmoid sinus thrombosis must be differentiated chiefly from erysipelas, brain abscess, meningitis, and particularly in children, broncho-pneumonia and pyelitis. There are a host of other conditions which may give rise to indefinite, irregular temperatures, and it should be kept in mind that if the mastoid infection has been associated with an influenza, the patient may run an indefinite temperature for a long time after the operation due to the original causative agent.

An erysipelas may develop at any time after the mastoid operation and, until the inflammation shows on the surface, one will often be in doubt as to what is causing the temperature. This is particularly so in the deep-seated erysipelas which takes some time to come to the surface. The chief differential points to be kept in mind are the following: In erysipelas the temperature is inclined to remain high or be remittent in type, the blood culture is invariably negative, the blood count is extremely high, the patient is much prostrated and sooner or later the characteristic inflammation appears.

As a rule, the infection of erysipelas takes place within a very few days after the mastoid operation. In sinus thrombosis the temperature is intermittent, the blood culture, in most instances, becomes positive after a time, the blood count is seldom above 18,000 white blood cells, the patient is in a condition of euphoria (well-being). As a rule, evidences of the infection do not show until the tenth or twelfth day.

Aside from the more favorable avenues of escape through the external cortex, it is clear that pus within the mastoid may travel in various directions, and in accordance with its point of entrance may lead quite logically to different lesions within the cranium. It may perforate the roof, or tegmenantri, giving rise to an extra dural abscess or as a later development of this lesion, to a cerebral abscess or it may travel backward toward the posterior fossa of the skull causing either a perisinus abscess in the neighborhood of the cerebellum or a cerebellar abscess. Passing downward and forward from the mastoid, or downward from the tympanic cavity, the infection may spread directly to the jugular bulb giving rise to a septic lesion within the jugular vein, not clinically distinguishable from a suppurative lesion within the laterial or sigmoid sinus.

The diagnostic differences from brain abscess will be apparent only by an analytical survey of all the symptoms. In brain abscess, the temperature is not characteristically high, there is usually a marked deep-seated, one sided headache and the patient is much prostrated. The blood culture is negative. Lumbar puncture may show clear fluid, under tension, with an increase in the lymphocytes. The blood count may not be very high and show nothing characteristic. Examination of the eye-grounds will frequently show a blurring of the disc or an actual inflammation of the optic nerve.

In meningitis, one usually observes a high temperature which is inclined to remain high instead of becoming intermittent. The blood culture is negative. Lumbar puncture will often show cloudy fluid,

under pressure, which, on culture, will reveal the infectious bacteria. There is a marked increase in the leukocytes in the spinal fluid. Other signs of meningitis will develop, such as Kernig's sign, opisthotonos, and so on.

The temperature of bronchopneumonia may be identical with the sinus thrombosis. The differentiation will rest chiefly on the physical signs which are found in the chest. These signs are not always easy to determine, especially if the pneumonia is a central one. As long as the blood culture remains negative, as long as the blood count is extremely high (higher than one would expect with sinus thrombosis) and as long as one finds any signs in the lungs which would make him suspicious of a bronchopneumonia, just so long should he keep away from any operative interference.

The differentiation from pyelitis must rest mainly on the findings in the urine. Pyelitis does not occur often in adults but is more common than is generally supposed in children and for that reason the urine of every child who has been operated upon for mastoiditis should be examined at frequent intervals. The temperature of pyelitis is intermittent, and it may be necessary to obtain a catheterized specimen of urine, particularly in a female child. Microscopic examination will often show a precipitate which is suggestive of pus but the specimen should be sent to a laboratory where it can be properly centrifuged and the sediment examined under the microscope, when characteristic pus cells will be found.

When both mastoids have been operated upon and a temperature suggestive of sinus thrombosis develops, and other symptoms occur, such as a positive blood culture, which will make one sure that there is a general infection from a sinus which must be closed off at once, how is one to tell which is the infected sinus? Which side is to be operated upon?

It will do no harm to the patient to have one jugular vein tied off but the ligation of both will no doubt result in death. Sometimes it is extremely difficult to tell which sinus is causing the trouble. Fortunately, seldom are both sinuses infected at the first operation. Which sinus was the more exposed? On which side was there a perisinus abscess? On which side was the sinus possibly injured? Which mastoid process looked the more diseased? Which of the mastoid wounds looked as though more infection was present?

All these questions must be answered and then one is often in doubt as to which sinus should be exposed. There are two ways of finding out which sinus is causing the trouble. In the first place, an examination of the eye-ground may be of assistance. On the affected side, the disc will appear blurred or there may be definite signs of an optic neuritis. An eye-specialist should make the examination, as the minutest details may be necessary.

The mastoid cavity which is suspected of causing the trouble, should be opened first and the vein uncapped until one feels assured that there either is or is not trouble there. If the vein shows up blue and with a shining wall and pulsates, the wound should be packed until the other sinus is explored. Almost always a more diseased condition will be found on one side than on the other; or a culture of the blood from one of the sinuses may show the seat of infection.

PROGNOSIS

As the amount of systemic infection will depend to a great extent upon the rapidity with which the diagnosis is made and on the severity of the infection, the prognosis can only be judged by the symptoms which result after the course of the infection has been eliminated. In certain unoperated cases, in which all the symptoms of sinus thrombosis are present, even a positive blood culture, the patient gets well but there is always a grave question whether there is not a dormant focus of infection present, which will break out at a later period, in the form of infected emboli which will attack the heart or the kidneys. Instances are on record of cases of acute endocarditis, with positive blood cultures, for which no ascertainable cause can be found. On tracing the history carefully, it is found that there has been an old ear suppuration.

On this history only, the mastoid processes have been opened up on the formerly diseased side and the sinus exposed. The sinus has been found to be filled with a clot which, on being removed, showed the same virulent organisms which had been recovered from the flood cultures. And, most amazing of all, the patients have recovered from their streptococcemia and endocarditis after the sinus had been cleaned

out and the jugular vein ligated. In other words, no one can feel assured that the patient, who had infected sinus, ever gets entirely well until the infection is eradicated by proper operation.

What is the prognosis in the cases which are operated upon? If the operation is performed early, before there has been much possibility of a systemic infection devitalizing the patient, or before metastatic abscesses have formed, the prognosis is good. The patient will go through a stormy convalesence. In the beginning he will be very much prostrated and may suffer from a loss of blood sufficient to warrant an intravenous infusion of salt solution or a transfusion of blood. For a few days following the operation, he will often be delirious, due to a great extent, to the alteration in the brain circulation. The temperature often remains high until the bacteria are eliminated entirely from the blood stream, but when it once begins to come down toward normal, it remains down.

The prognosis from then on is extremely favorable. However, when the operation has been delayed, either because the symptoms were not distinct and one could not determine that an operation was definitely necessary, or because the patient or his relatives would not consent to a second operation, until the patient was almost in extremis, the prognosis is very grave. In spite of the most careful operation at a time like this, the infection has gone so far the patient is beyond hope. Or, with the exception of the jugular vein, there are still sufficient bacteria in the system to result in the formation of various metastatic abscesses which may lodge in any part, a joint, the lungs, kidneys, heart, pleura or liver.

Such abscesses will have to be opened if their location warrants it but where the kidneys or the heart has become affected, one must depend upon the most careful nursing and medicinal treatment and then it will be a question whether the patient will ever be in robust health again. However, even under the worst conditions, it is surprising to see how soon all symptoms will disappear after the proper surgical treatment has been instituted.

Statistical tables from various ear hospitals show that the prognosis from sinus thrombosis is extremely grave but these statistics will not apply to patients in private practice who can be watched carefully. With the careful observation of symptoms both before and after the operation upon the sinus, the patient always stands a good chance for recovery and, even when conditions are at the worst, one should never prognosticate a hopeless ending.

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COLOBOMA OF IRIS, CONGENITAL*

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Gould's medical dictionary gives the following definition for coloboma, "a fissure, especially of parts of the eye." A congenital coloboma of the iris, therefore is a congenital fissure of the iris. This condition may be unilateral or bilateral, complete or incomplete, and the fissure may be wide or narrow. It may be said to be a deficiency in the tissue of the iris, the amount of deficiency determining the shape and degree of the coloboma or altered shape of the pupil. It is practically always found downward in the position of the fetal cleft although it may be either upward, outward or inward. I have never observed one except in the downward position. It is generally supposed to be caused by the failure of the closure of the fetal cleft or an arrest of development.

It is frequently associated with the same kind of defect in the choroid as well as fissures of the eyelids, palate and lips. Microphthalmus and congenital cataract are also said to sometimes be associated with this condition.

This condition being somewhat rare and our textbooks having so little to say on the subject, I have often wondered why more has not been written about the condition. Traumatic as well as artificial coloboma are quite familiar to all of us so I will not take your time with a discussion along that line.

I have seen so few congenital colobomas, I have wondered if possibly some of you have not seen a sufficient number to tell me of your experience as well as ideas of them.

In the study of any congenital anomaly

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it is essential we know the embryology and anatomy as well as the pathology of the part or parts which are involved, consequently I will review briefly the iris merely to refresh your memory.

The iris is the circular membrane perforated in its center separating the anterior and posterior chambers of the eye, of various colors, depending upon the amount of pigment deposit and is situated immediately behind the cornea and in front of the anterior lens capsule, its periphery alone being attached, the aperture or pupil swinging free and dilating or contracting and excluding or permitting light to enter the eye. The peripheral border springs from the head of the ciliary body and the ligamentum pectinatum "on the anterior surface is seen radially directed wavy lines converging toward the circle of irregular elevations and small depressions (crypts) situated near the pupil; other finer lines are seen extending from this ring to the pupil." (May) A delicate spongy connective tissue stroma containing a great many nerves and vessels, branched pigmented cells and muscle fibers go to make up the structure of the iris. Anteriorly, there is the endothelium, a simple layer of flat polygonal cells. Posteriorly there is the pars iridica retinae and it is covered by the mesenchymal epithelium of the chambers of the eye.

The vessels are the long posterior ciliary arteries from the two branches of the ophthalmic which divide into an upper and lower branch, these then anastamose with the corresponding vessels of the opposite side forming a vascular ring just behind the attached margin of the iris. Branches are given off from this to the ciliary body and iris which pass to the pupillary border, there by anastomasing they form another but much smaller vascular ring. The veins, corresponding to the arteries as just described, communicate with the canal of Schlemn and pass backward to the venae vorticosae.

The nerves are the third, nasal branch of ophtahalmic and sympathetic with some from the plexus in the ciliary body.

Notches in the pupillary border have been described by Levinsohn and Lindberg. There may be several notches in the same eye.

I have seen a few cases where upon first observing the eye what was at first thought to be a heavy deposit of pigment was later found to be the retinal pigment showing through a defect in the iris. Some of these defects were circular, some irregularly round and some were as a hair being placed upon the iris. This condition is not to be confused with polycoria, a condition in which there is a band across the coloboma making two or more pupils.

These spots are found at different places in the iris, some to the nasal, some to the temporal and the majority of them inferior to the pupil. I have not seen any superior to the pupil.

Fuchs, in his textbook of ophthalmology, has the following to say which is the clearest and best description I have been able to find. "Coloboma of the iris is likewise connected with the ocular cleft. The iris grows out from the anterior margin of the secondary ocular vesicle and the redimentary choroid, at a time when the fetal ocular cleft is already closed; hence the iris in no state of its development has a fissure. But when the optic vesicle and the mesodermal tissue covering it suffer a derangement of development at the site of the retinal cleft, it is conceivable that derangements may also take place in the same meridian further forward and in that case may affect the iris. For example, the mesoderm at this spot (vascular lens capsule) may have an unusually solid connection with the mesoderm that forms the envelopes of the eye. A firm band of this sort necessarily prevents the iris from growing forward. This may happen even when the cleft in the retina and choroid has closed completely, so that then a coloboma of the iris is produced without a coexisting coloboma of the choroid."

I wish to report two cases, the family of one does not show transmission of the condition while in the other fifty per cent of the children show coloboma.

Case No. 1.—W. A. G. Married. This man held a very responsible position in that he was secretary to the owner of one of the largest coal companies in Oklahoma. His duties required the use of his eyes many hours each day, yet I am informed by the members of his family (he being deceased) that although he was refracted many times he at no time was able to obtain glasses that would benefit him. He had bilateral inferior coloboma complete. The iris was light blue in color. His past history was negative. Family history: Has two daughters and one son, all of whom are

grown and unmarried. Neither of these have any signs of coloboma, their vision is normal. Had three sisters, one half brother and three half sisters, none of whom had coloboma. The parents and grandparents on both sides as well as uncles, aunts and cousins were free of coloboma.

Case No. 2.—W. A. E. Married. Occupation, real estate and insurance. Up until the time of this man's death a year or two ago, his distance vision was good but he was compelled to wear glasses for reading. He had bilateral complete coloboma, inferior.

I tried to get his personal history but he knew nothing of his family, as he left home at a very early age. He claims to have received his coloboma by having a horse fall with him in a race when he was about 14 years old, claiming to have received an extremely hard fall at that time hurting his head.

He was the father of six children, three boys and three girls. Three, or fifty percent of the children have this defect, the other three not having it. The children in the order of their birth are as follows: J. (f) no coloboma. Mrs. S. (f) yes, left eye complete coloboma, right normal. Has one child which does not have coloboma. Lef (m) no coloboma. W. (m) yes, left complete, with an incomplete coloboma of right which appears as a thinning of the iris. R. (m) yes, left complete, right has no coloboma. M. (f) no coloboma.

Each one of the five mentioned above have their coloboma in the inferior quadrant of the iris in the vertical position. The vision of the children of both families is normal for each of them.

CONCLUSION

There is no question but what this condition may be transmitted from parent to child, but not all children of a parent with this condition will inherit it, neither do the children of a parent with a bilateral condition inherit a bilateral condition. I naturally suppose the child of a person having a unilateral condition might have either unilateral or bilateral coloboma.

While it is true the children of the first man are free of coloboma and three of the second man, what are the chances of the children of these children inheriting the grandfather's condition? There is one grandchild only in the two families and this child escaped. What are the chances for its children to develop the condition?

Relative to the causation of the coloboma of the second man, my opinion is that either he had this condition prior to his fall and had either failed to observe it, or know of it, or else he had an incomplete condition there which was made complete by the jar occasioned by the fall, he then observed or had his attention called to the condition. I am sure the fall did not cause the condition but that the groundwork was there before the fall or else he would not have transmitted the condition to fifty percent of his children.

Another feature of these cases is that the children inheriting this condition all have a complete coloboma of the same eye, namely the left eye, with only one of them having an incomplete condition of the right eye. I feel that should the young man who has the incomplete coloboma of the right eye receive hard enough fall or blow he would be likely to have the right become a complete coloboma.

A peculiarity about the parents and children mentioned is that they all have blue iris. As to whether this phenomenon would or does have any influence on the causation or predisposition to this congenital condition, I am unable to say.

ASTHENOPIA*

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The terminology covers a multitude of conditions associated with local as well as general diseases and anomalies. The classification as given in books of the previous generation covers the subject very thoroughly. However, the trend of the present day civilization has aggravated the severity of the symptoms to the extent that too much time of any ophthalmologist can not be spent in considering the cure or amelioration of this condition. In endeavoring to present to you such a vast and indefinite subject, I wish to emphasize, for discussion, those points that seem of importance to me which come up in our daily practice. The art of ophthalmology is more definitely concerned with conditions arising from the minor things and coming to us daily

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for solution, than with the major ophthalmic questions that confront us periodically in which we can only secure indefinite results. If proper consideration is given to early symptoms, a very definite effect will be had in the lessening of all the graver ophthalmic problems.

Symptoms of asthenopia call the attention of the patient to his eyes for the first time. Heretofore, the eyes have been only a part, but with the first discomfort a vague fear ensues, and he begins to appreciate the value of vision for the first time. Having created an eye consciousness, his mind remembers the striking advertisements that have been ever before him, he consults the optometrist whose originality has displayed the most striking advertisement, and glasses are acquired, which only too often have only a psychological effect. At some later date, often after several pairs of lenses have been acquired, the ophthalmologist is consulted by a very skeptical individual who presents both a medical and a psychological problem. First, a careful history must be taken, giving due attention to any symptoms that may be caused by other conditions, then a careful and thorough examination of the eyes is made which will discover the cause and effect relief of symptoms. When the ophthalmologist, for various reasons, makes a superficial examination, the results are usually poor, and the patient is often condemned to the life of a neurotic, with its resulting journey through innumerable doctors, osteopaths, chiropractors, and the vast number of advertising quacks. This places a great deal of responsibility upon the ophthalmologist, who, for a fee, undertakes to examine the refractive, and the anatomical apparatus of the eye.

The life that we lead in the present age is one of extreme stress due to marked concentration and excesses in particular endeavors. This being an age of specialization, we find that most of our patients do things more or less in routine which require entire concentration for a very long period of time, giving them small opportunity to relax. This affects ophthalmology, chiefly in those individuals who do a great deal of near work and those individuals who do a great deal of motoring. There is very little difference in the effect of prolonged concentration of the visual focus whether it be in watching the ever changing road or in concentrating on some near object. The most important factor in the cause of eye symptomatology is the constant fixation of the visual focus. Therefore, it is just as important to correct muscle imbalances and errors of refraction in those individuals who concentrate at a distance as it is for those whose work requires concentration at the near point.

To measure the refractive error, routine attention to detail must be observed. In my opinion, it is impossible to dispense with the cycloplegic in individuals who are not presbyopic and even in the early presbyopic patient it is sometimes most difficult to do an accurate refraction without their aid. After cycloplegic, I consider the retinoscope to be the main factor in determining refractive errors. It is the only method that we have that gives us an accurate index to the refractive media. After the retinoscope has been used it is then necessary to follow along the routine refracted route leaving no point unchecked.

It is never wise to order glasses on one examination—a manifest refraction is of great value. I prefer the post-cycloplegic, first, because it is much simpler, second, because you actually know the patient's reaction to the corrective lenses. In determining the exact prescription we must of necessity take into consideration the life of the individual, correcting him so that the changes will not interfere too seriously with his routine. In those cases where the refractive error is very high they should be advised of the fact and told that they have eyes that do not tolerate excessive focusing, and borrowing from the quack, advise them that when they begin to notice a very small amount of discomfort or tightness around the eyes, to cease work for thirty seconds and allow their eyes to roam around, looking at objects at various angles. A complete circuit of the room which can be made in from five to thirty seconds, if made when first symptoms of discomfort are evidenced, will make the work of these individuals very much more comfortable.

We have at the present day an excessive amount of illumination. This affects brunettes moderately and blonds very definitely, therefore, illumination should be considered as a factor in prescribing for individuals suffering with asthenopic symptoms, the lenses that eliminate the ultra-violet rays of light being prescribed for all individuals who have a deficiency of

retinal pigment. It has been my observation that people who have a deficiency of pigment are fortunate if they have sufficient refractive error to force them to wear corrective lenses, otherwise they are greatly annoyed by glare, blepharitis, and conjunctivitis.

Muscular imbalances or improper co-ordination of the ocular muscles may or may not be present with either ametropia or emmetropia, and any muscular deviation from the normal merits attention. In my opinion any exophoria or hyperphoria which is not entirely corrected by refraction should be corrected by prisms. The rule that I use for correction, is to give from one-fourth to one-third of the prism necessary to correct the muscle insufficiently at a distance of twenty feet. This I have found gives the patient a great deal of comfort and if the general health of the patient is checked over and corrected, will, not infrequently, restore normal muscular balance. I do not consider that it is necessary to use prisms for esophoria.

General conditions of the body play a very vital part in eye symptoms and must be considered in all patients. The nasal accessory sinuses, tonsils, teeth, and intestinal toxemias are the most frequent offenders and should be checked, particularly where the refractive error is not sufficient to acount for all symptoms, for when the patient's symptoms are cured by the removal of an abscessed tooth he does not feel that even a very expensive window glass was of much value to him.

Neurasthenia and general debility are frequently associated with the eye symptoms in which the muscular and refractive appartus is normal. The ophthalmologist, being the first doctor consulted, should explain in detail the condition present, and should see that the patient consults a physician who is competent to effect a cure. If he does not manage these patients, we soon see the patient with glasses that are being changed at frequent intervals, and the medical profession is discredited. Where the patient has a definite eye complex, and has been wearing glasses for a long time, he does not appreciate being told that he does not need glasses. Such patients, if properly handled, will be relieved and will discard their glasses in time, to the benefit of the patient and the ophthalmologist.

Asthenopic symptoms are the responsibility of the ophthalmologist. Often it is necessary to use the talent of all the various specialties in medicine in order to affect a cure, hence, it is very easy for the patient to go astray unless someone has the responsibility of the direction of a complete investigation. The ophthalmologist is the one best fitted to correlate findings and must assume the responsibility if these patients are to receive the results that they have a right to expect.

Case No. 1.—H. B., age 12; refracted 1920, vision 20-40; with plus 3.00, axis 90 and plus 2.50, axis 90, vision was 20-20. Wore glasses continually until 1923, when frames became too small; she discarded them for one year, then consulted someone else, and was given glasses by two ophthalmologists and two optometrists; eyes were very uncomfortable with frequent severe headaches.

Patient consulted me again April, 1929, with severe blepharitis and asthenopia; unable to do stenographic work; vision O. U. 20-70; with glases, minus 2.50 axis 30 and minus 2.00 axis 180, vision 20-20. Homatrophine was used and patient had 20-20 vision with a plus .25 combined with a plus 2.00, axis 150, and a plus .37 combined with a plus 2.00, axis 100, on post-cycloplegic it was impossible to give her more than plus 1.50, axis 150 and plus 1.50 axis 100, vision 20-30. One month later, vision O. U. 20-20, blepharitis cured, and only a small amount of eye discomfort.

Case No. 2.—H. C., age 32; has been wearing glasses for 12 years, had eyes examined three months previously and glasses changed, because of twitching of extrinsic muscles and marked nervousness and indigestion. Vision O. U. 20-30, with plus 1.00, axis 120, O. D.; and plus 1.00 axis 60, O. S., his vision was 20-15. He was refracted under homatropine and his glasses were found to be correct except for 3 1-2 degrees of exophoria. Inasmuch as he had just been carefully examined by a competent internest, with negative findings, one-half a degree of prism, base in, was added to the correction he was wearing in each eye. Patient reported one month later that his eyes felt fine and that his nervousness and indigestion were entirely relieved.

Case No. 3.—M. F., female; age 58. Chief complaint: Unable to read, soreness of eye-balls, and periodic attacks of migraine requiring her to go to bed for two or three days.

General physical findings were negative. Patient was wearing O. U. plus 1.00 for distance and plus 3.50 O. U. for reading with which vision was normal. Examination: Media clear, fundi negative, tension normal, fields normal, O. U. vision 20-40 with plus 1.00 combined with a plus .87, axis 180, vision 20-20, add plus 2.25 for reading, exophoria 10 degrees. This correction was given and patient reported an absence of symptoms two months later.

Case No. 4.—M., age 52. Chief complaint: Headaches, nervousness, twitching of muscles in left eye, unable to read very long and could not sleep. Had had repeated examinations, two of which were completely physical, by outstanding clinics; four eye examinations in the last two years. Patient was wearing plus 1.00, axis 180 with an add. of plus 1.75 for reading. Examination of eyes was negative; tonsils out; nasal accessory sinuses negative; teeth were removed. He complained of some slight discomfort in left maxillary region; had had three upper plates made in three years. Examination revealed a normal looking mouth except that there was a small thickening of the upper gum margin on the left side; a roentgenogram was made and an un-erupted third molar was removed. Patient's symptoms cleared up in about six weeks' time.

Case No. 5.—Male, age 8. Chief complaint: nervousness and under weight. Past history: Had usual diseases of childhood, chorea at five years of age; after T. & A. made a complete recovery except for nervousness and weight; was constantly under care of a competent pediatrician; was wearing glasses, plus .50 in each eye, fitted by an optometrist. Vision O. U. 20-20. Under homatropine eyes were examined and plus 1.25, axis 180, right; plus 1.00, axis 165, left, were prescribed. Three months later the mother reported a marked improvement in nervous symptoms and four pounds gain in weight; one year later his weight was normal and she no longer paid weekly visits to the pediatrician.

CONCLUSIONS

1. Asthenopic symptoms are caused by numerous conditions, both local and general.

2. Careful attention to detail and a complete examination of the body and eyes are essential for relief of symptoms.

3. Eye symptoms are the responsibility of the ophthalmologist—the patient should not be dismissed with a negative refraction.

DACRYOCYSTITIS*

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Obstruction of the lacrimal passages is the cause of disease of the lacrimal sac. Aside from a few systemic diseases, such as syphilis and tuberculosis, the obstruction is caused by caseous masses from meibomian gland secretion, foreign bodies or congestion of the nasal mucus membrane. The first two need ophthalmic treatment and the last nasal. Simple dilation of the puncta and syringing of the sac will remove practically all obstructions without probing. When the latter is necessary, there are some things to consider. It must be remembered that the nasal duct is not usually straight, as is illustrated in most text books, but is decidedly curved or may have invaginations of the mucus membrane or even diverticula, and in passing a probe it may pass into these invaginations and make a false passage, with its ultimate dangers of infections, or permanent closure.

If the lacrimal passage becomes obstructed with any detritus containing pathogenic bacteria, the lacrimal sac becomes affected, inflamed, swollen with the production of pus; then the condition of dacryocystitis is produced. If drainage cannot be secured through the nasal duct to the nose, the cure of this condition, from the ophthalmological standpoint, is an excision of the sac. The most common operation for extirpation of the sac is, or has been, Miller's operation, and it has been given with very good results but there are objections to this as well as all other external operations of this type. First, the patient has the fear of a scar. Second, the question of tearing. You can assure him there will be no scar of consequence but as to the tearing, you can only assure him there will be a diminution but not complete cessation.

A large per cent of these come for relief from this annoying epiphora, and if this cannot be definitely promised, your patient is going to hesitate in having his tear sac removed. On the other hand, when

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you mention the substitution of an intranasal operation, your patient takes more kindly to it than the external operation. it stands to reason he should, for he will have a functioning tear apparatus and this is what he is primarily seeking as well as being relieved of the anxiety of an external defect.

Operations based upon many different principles, some surgical, some not, have been devised and exploited. The very fact that there are so many operations, and so few sponsors for each, is sufficient evidence that none has attained a degree of perfection satisfactory to a majority of operators.

In lacrimal sac surgery, we have two distinct objectives, we must prevent the recurrence of infection, and for all time relieve this annoying epiphora. There are a few outstanding operations designed to relieve this condition. These are: West's operation, the Toti operation. which has been modified by Mosher, Pooley's operation, and the Dupuy-Dutemps and Bourguet operation.

The West operation is essentially a nasal procedure. The Toti-Mosher operation is a combined intra and extranasal technique, while the Dupuy-Dutemps and Bourguet is entirely from the outside. The first two methods have met with a high degree of success, West claiming 90 per cent cures, while in the Toti-Mosher, we have the percentages from 95 per cent to 97 per cent. This latter operation, when it is better known, will make a strong appeal too, and become very popular with the ophthalmic surgeons for three very good reasons. First, it is the only operation which preserves intact the lacrimal sac. Second, it is the only operation which provides a definite means of maintaining the potency of the newly made drainage canal. Third, it is the only operation which provides against the formation of granulations which defeat an otherwise successful technique.

The operation as done by Mosher is essentially as follows: The incision begins midway between the bridge of the nose and the inner canthus carried in a straight line downward to the bone, one and a half to two centimeters. The carefulness of the incision has much to do with the scar. The shorter the better, but do not handicap your operation by too small an incision in order to avoid a scar. Beginning above, the periosteum is elevated downward and backward, turning the sac out of its position in the lacrimal bone and ascending process of the superior maxillary. This dissection is carried a little below the crest of the lacrimal bone. The sac having been exposed, identified, and laid to one side, an opening is made into the nose through the lacrimal bone and ascending process of the superior maxilla formerly occupied by the sac. This opening is enlarged anteriorly by removing a part of the ascending process with a punch. The opening should be as large as the sac, but no larger, otherwise the incision when closed will have no underlying support and develop a scar. The nasal mucus membrane is next trimmed flush with the bony opening. This is done by introducing some small flat instrument into the nose, pushing the mucus membrane into the field of vision where it can be grasped and removed, making a clean well-defined opening into the nose which is important for successful results. The care of the sac in this operation is highly technical, the inner half is removed by making a perpendicular incision along all of its anterior margin and a horizontal one along its summit, removing the flap thus made, the remaining portion of the sac is carefully sutured into the periosteum covering the nasal bone. This technique can be simplified by using the method of Pooley in removing the end of the sac, and bringing it down to make a direct connection with the mucus membrane of the nose, fixing it with a few fine cat gut sutures, and packing the nose with ribbon gauze, leaving it there for three days when it is removed and the canal washed out through the lower puncta.

The endonasal operation as done by West is commendable, while it is difficult to expose the sac by this route, yet the operation is simple when the patient is properly prepared. West divides his technic in three steps. First, a preliminary incision of the puncta a few days preceding the operation. Second, if there is any defection of the nasal septum to obstruct the view, a resection is made. And third, the anterior end of the middle turbinate is removed.

The lacrimal fossa, on the inner wall of which the sac rests is the anatomical landmark by which we are guided. This fossa is made up of two segments of bone united by a vertical suture, anterior segment belongs to the superior maxilla, posterior

segment to the lacrimal bone. It is at this place the chisel is placed to resect the wall which is very thin. Upon getting the bone clear, a sound is passed through the canaliculus into the sac gently pressing it into the finestra made in the bone. It is then grasped by forceps and a good portion removed. The wound is packed and left for three days, removed and the canal washed through the canaliculus, removing all clots which may have formed. Either of these operations is not a success unless a drop or two of colored solution in the conjunctival sac reappears in a few minutes in the nasal cavity.

BRAIN ABSCESS FOLLOWING MASTOIDECTOMY*

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REPORT OF CASE

Brain abscess of otitic origin is, fortunately, of infrequent occurrence. Extension of the infection from the middle ear or the mastoid to the cranial cavity is usually direct by continuity. The abscess is generally located on the side with the affected ear and is usually found in the temporal lobe or in the hemisphere of the cerebellum. There are exceptional cases in which the abscess is located on the side opposite the diseased ear, these cases evidently being due to a pyemic metastasis. The case which I wish to report today was one of direct extension with the abscess located in the temporal lobe on the side with the diseased ear.

The patient was a well developed, robust male, aged twenty. A simple mastoidectomy was performed on the right side October 14, 1928, followed by an uneventful recovery. On January 23, 1929, he reported to the office with an acute suppurative otitis media on the left side. Paracentesis of the drum membrane was done and free drainage established. He continued to have elevation of temperature and severe pain in the ear until January 28, when symptoms of acute mastoiditis developed. He was sent to St. Anthony's Hospital where a simple mastoidectomy was performed January 30th. Blood examination showed nothing unusual in this type of case. Culture from the ear showed staphylococcus. A massive mastoid, as shown by the X-ray, was found at operation. In the process of cleaning the entire area, the dura over the middle fossa was uncovered.

Following operation, the temperature ranged from 99 to 103 degrees Fahrenheit. On the sixth day there was a sudden rise to 106 accompanied by a slight aphasia and rather severe headache in the left temporal region. The temperature gradually declined to practically normal by February 11th, at which time the patient developed a bilateral Babinski with a tendency to ankle clonus. A neurologist was called in consultation and he advised exploration of the brain through the mastoid opening. The original wound was enlarged, exposing the dura for a space of about 1 by 3-4 inches. The brain was explored with a groove director and an abscess found about one inch from the surface in the temporal lobe. A soft rubber drain was inserted but this came out with the dressing five days later and was left out. On February 18th, there was a sudden rise in temperature to 106 accompanied by twitching of the right arm and leg. The pupils were dilated and unequal and nystagmus was present. The patient was unconscious. At no time had there been any choked disc or projectile vomiting. The abscess was again found and evacuated through the original opening, this procedure being followed on the advice of the neurologist. A soft rubber drain was left in place but two days later it was removed and a fenestrated rubber tube inserted. This was left in place until pushed out from within on March 15th. During this interval of 25 days, the patient was apparently recovering. The aphasia was gradually lessening, the twitching of the arm and leg had disappeared and the eye symptoms were no longer present.

On March 25th, the aphasia became worse, a partial paralysis of the right side developed and the patient became stuporous. This apparently continued about stationary until April 4th, when a choked disc in each eye was noted. A brain surgeon was called in consultation. He advised and did a craniotomy in the left temporoparietal region and drained a large abscess which was found about one and one-quarter inches from the surface. A soft rubber drain was inserted and left in place for three weeks when it was removed and the wound allowed to heal. There had been no discharge for a week prior to the removal of the rubber drain. Following the cranio-

*Read before section on Eye, Ear, Nose and Throat, Annual Meeting, Oklahoma State Medical Association, Oklahoma City, May, 1929.

tomy, the patient showed steady improvement. The stupor passed, the aphasia improved, use of the right side was gradually regained and the choked disc cleared. He was discharged from the hospital on May 6th, 97 days from the date of his admission. He made three trips to the office, subsequently, walking in each time and was then allowed to go home.

This case represents one of the apparently happy results following brain abscess. It is regretted that we didn't exercise a little more care in the original operation when we uncovered the dura and thereby, in all probability, have avoided the development of the abscess. After its development and in the light of subsequent events, it seems that it was a mistake to explore the brain through the original opening but that a craniotomy should have been done in the beginning.

REPORT OF EXAMINATION FOR LICENSES TO PRACTICE MEDICINE

Report of examination of the Oklahoma Board of Medical Examiners, held at University Medical Building, Oklahoma City, Oklahoma, June 11, 12, 1929. Number of subjects examined in, 12; total number of questions, 120; percentage required to pass, 75; total number examined, 43; number passed, 43.

Name	Year of Birth	Place of Birth	School of Graduation	Year of Graduation	Home Address or Previous Location
Black, Harold James	1900	Moulton, Ia.	Univ. of Iowa	1925	Tulsa, Okla.
Kengle, George Lewis	1897	Augusta, Kan.	St. Louis Univ.	1926	Enid, Okla.
Harvey, John Henry	1888	Waldron, Ark.	Univ. of Ark.	1911	Heavener, Okla.
Hasty, James Hiram	1880	Canton, Ga.	Ga.Col.Ecl.Med.&Surg.	1908	Blair, Okla.
Prestridge, Bendo Allen	1880	Martin Mills, Tex.	Univ. of South	1909	Hastings, Okla.
Shelton, Baxter Wright	1903	Walker, Mo.	Washington Univ.	1928	St. Louis, Mo.
Van Arsdel, Paul Parr	1900	Indianapolis, Ind.	Indiana Univ.	1926	Enid, Okla.
Campbell, Coyne Herbert	1904	Davidson, Okla.	Rush Med. Col.	1928	Frederick, Okla.
Dulin, Edgar Armstead	1843	Washington, D. C.	Georgetown Univ.	1865	Bartlesville, Okla.
Smith, Delbert		Oklahoma	Univ. of Okla.	1929	Oklahoma City
Buckholts, Walter Howell		Duncan, Okla.	Univ. of Okla.	1929	Elmore City, Okla.
Martin, Howard Choice	1904	Sherman, Tex.	Univ. of Okla.	1929	Tulsa, Okla.
Thompson, Wayman J.	1904	Nowata, Okla.	Univ. of Okla.	1929	Oklahoma City
Beatty, George Lewis	1904	Oklahoma	Univ. of Okla.	1929	Oklahoma City
Hathaway, Euel Park	1903	Pontotoc, Okla.	Univ. of Okla.	1929	Mt. View, Okla.
Albright, Arnold Archibald	1903	Perkins, Okla.	Johns Hopkins	1929	Perkins, Okla.
Long, John Herman	1904	Choctaw, Okla	Johns Hopkins	1929	Norman, Okla.
Sadler, LeRoy Huskins	1904	McAlester, Okla.	Univ. of Okla.	1929	Oklahoma City
Watson, O. A.	1906	Blair, Okla.	Univ. of Okla.	1929	Oklahoma City
Sayers, James Rolland	1898	Oklahoma	Univ. of Okla.	1929	Oklahoma City
Morgan, Chesley Andrew	1899	Robberson, Okla.	Univ. of Okla.	1929	Oklahoma City
Watson, R. Delbert		Blair, Okla.	Univ. of Okla.	1929	Oklahoma City
Cotteral, John Robert	1899	Guthrie, Okla.	Univ. of Okla.	1929	Oklahoma City
Mathias, Charlie M.	1902	Iowa	Univ. of Okla.	1929	Oklahoma City
Coston, Ralls McKinney	1902	Haskell, Tex.	Univ. of Okla.	1929	Birmingham, Ala.
McClure, Joy L.	1901	Ringwood, Okla.	Univ. of Okla.	1929	Oklahoma City
Stephenson, Ishmael F.	1906	Klondike, Tex.	Univ. of Okla.	1929	Oklahoma City
Stillwell, Robert Jerry			Univ. of Okla.	1929	Oklahoma City
Ferguson, Edmund Gordon	1900	Gameron, Tex.	Univ. of Okla.	1929	Oklahoma City
Adams, Robert H.	1896	Iowa	Creighton Med.	1929	Oklahoma City
Diaz, Carlos J. Hermandezy	1905	Spain	Univ. of Okla.	1929	Oklahoma City
Jenkins, Henry Blackburn	1895	Rome, Mo.	Univ. of Okla.	1929	Depew, Okla.
Sterling, Harold William	1903	Duenweg, Mo.	Univ. of Louisville	1928	Oklahoma City
McAlister, Lawrence Sevier	1905	Webbers Falls, Okla.	Univ. of Nebraska	1929	Council Bluffs, Ia.
Brown, Thomas Guy	1894	Peel, Ark.	Univ. of Okla.	1929	Oklahoma City
Corbin, Damon Elliott	1905	Kirkswell, Mo.	Univ. of Okla.	1929	Oklahoma City
Yeary, Glenn Hillis	1906	Elmore City, Okla.	Univ. of Okla.	1929	Elmore City, Okla
Willard, Delbert Gordon	1901	Chillicothe, Mo.	Univ. of Okla.	1929	Norman, Okla.
Trapp, Irvin B.	1896	Philadelphia, Miss.	Univ. of Okla.	1929	Oklahoma City
Lawson, Patrick Henry		Wayne, Okla.	Univ. of Okla.	1929	Oklahoma City
Dowell, Carr Thomas, Jr.	1906	Temple, Tex.	Univ. of Okla.	1929	Oklahoma City
Lane, Lloyd Charles	1905	Roff, Okla.	Univ. of Okla.	1929	Oklahoma City
O'Connell, Raymond	1902	Delaware, Ohio	St. Louis Univ.	1927	Tulsa, Okla.
Woodward, Neil W.	1898	Elsboro, Iowa	Univ. of Okla.	1929	Oklahoma City
Todd, John Broadus	1900	Gorman, Mo.	Univ. of Okla.	1929	Tulsa, Okla.
Canada, Joseph Clayton	1903	Kemp, Tex.	Univ. of Okla.	1929	Oklahoma City
Saylor, Robert Martin	1903	Seiling, Okla.	Univ. of Okla.	1929	Oklahoma City
Little, John Rudulph	1906	Auburn, Ala.	Univ. of Okla.	1929	Oklahoma City
Jennings, Aubrey L.	1904	Barlett, Tex.	Univ. of Okla.	1929	Oklahoma City
McFadden, Candour Alfred	1903	Wellston, Okla.	Univ. of Okla.	1929	Oklahoma City
Earnheart, Harold Ernest	1903	Dangola, Ill.	Univ. of Okla.	1929	Oklahoma City
Castronovo, Joseph	1900	Providence, R. I.	Jefferson Med. Phil.	1921	Ponca City, Okla.
Morgan, Louis Schubert	1897	Arkansas City, Kan.	Memhis Hosp. Med.	1910	Sallisaw, Okla.
Chcek, James Anthony	1878	Georgia	Marion Sims	1902	Grove, Okla.
Walker, Charles Franklin	1875	Arkansas	Bishop's Univ.		
Silverman, Abraham Hertz	1883	Russia	Lennoxville, Canada	1905	Holdenville, Okla.

THE JOURNAL

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DR. CLAUDE A. THOMPSON.....Editor-in-Chief
Barnes Building, Muskogee, Okla.

DR. P. P. NESBITT.....Associate Editor
Medical Arts Building, Tulsa, Okla.

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Articles sent this Journal for publication and all those read at the annual meetings of the State Association are the sole property of this Journal. The Journal relies on each individual contributor's strict adherence to this well-known rule of medical journalism. In the event an article sent this Journal for publication is published before appearance in the Journal, the manuscript will be returned to the writer.

Failure to receive The Journal should call for immediate notification of the editor, Barnes Building, Muskogee, Oklahoma.

Local news of possible interest to the medical profession, notes on removals, changes in address, births, deaths and weddings will be gratefully received.

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EDITORIAL

THE TREATMENT FOR MALARIA

It would seem to be unnecessary and inexcusable to have to take up for discussion the proper treatment of malarial infection but the writer has considerable personal knowledge which would warrant the belief that there are great difficulties in properly treating malarial infections. Stripped of the surroundings, these difficulties consist in the lack of unanimity of action on the part of the physician and lack of intelligent cooperation on the part of the patient. The physician, or many of them for years have been inclined to seek a better remedy than the best one yet known and in doing so have fallen into the habit of securing and applying inferior measures for the treatment of the infection. It has been nearly a quarter of a century since a commission fostered by the American Medical Association, basing its conclusions largely upon Porto Rican experiences, decided that the superior cure for as well as the efficient control of malaria was to be found in quinin sulphate and that all dilutions, compounds, mixtures and "messes" composed partly of quinin and alleged adjuvants were inferior to quinin itself.

Bass, (a), some years ago noted that no two textbooks on malaria gave the same treatment unless one copied from another. The dose was from 10 to 40 grains and indefinite for children. He noted that there were two ways of controlling malaria: one by destroying the mosquitoes, the other by controlling the parasite in man and we have to choose the most practical means or both. He noted that 10 grains nightly for eight weeks disinfected 90 per cent. of all infected persons treated. The other 10 per cent had to receive somewhat more quinin; that is, up to three 10 grain doses daily for a few days, followed by 10 grains daily for eight weeks. These conclusions were arrived at about the same time by a French Army Commission at Salonika, and in Macedonia and a British Army Commission on the Tigris River, both age old pest holes of malarial infection. The study of Bass and these two commissions covered thousands of cases.

Perhaps one of the most authoritative statements as to many phases of malaria, recently issued, is that by Craig, (b). Colonel Craig not only considers briefly most of the phases of malaria but has stressed the use of quinin as a prophylaxis against malaria. He considers the relative merits of different preparations placing quinin in its various forms as the premier or *sine qui non* of proper treatment. Oral administration of quinin is held to be superior to any other. He notes that intramuscular injection of quinin is, as a rule, to be condemned. He naively notes that "the most common cause of nonabsorption of prescribed quinin has been found to be the failure of the patient to take the drug. It was discovered that some 25 to 28 per cent of hospital patients fail to swallow their quinin.

The patient fails to cooperate in the treatment of malaria by having the delusion that he is cured upon the disappear-

ance of acute symptoms. Relatively he does feel very well after a chill and the subsidence of fever but he knows little or nothing of the chronicity and tenacity of the infection in certain individuals.

A recently lauded remedy, "Plasmochin" has been found to be not as effective as first thought so it has fallen into the class of "compounds" to which in order to be effective, quinin must be added.

We feel almost like apolgizing for having to remind physicians, who have seen large numbers of cases of malarial annually over many years that the simplest and most effective system of treatment is that of simplicity itself and that up to now departures seeking improvement over quinin in the treatment of malaria have always ended in failure.

The article by Colonel Craig is to be commended to every practitioner.

(a) Bass, C. C., New Orleans. Trans American Therapeutic Society, June 6, 7, 1919.
(b) Malaria, Chas. F. Craig, Medical Corps U. S. Army, Archives of Pathology. Vol. 6, October, 1928.

Editorial Notes—Personal and General

DR. I. W. BOLLINGER, Henryetta, has returned from visiting clinics in Chicago.

DR. C. F. MOORE, Durant, recently visited Los Angeles and other Pacific Coast points.

DR. B. A. OWEN, Perry, who underwent an operation for appendicitis, is reported improving.

DR. THOMAS M. BERRY, Eldorado, has been appointed surgeon for the Frisco Railroad at that point.

DR. D. ARMSTRONG, Durant, spent the first half of July in San Antonio with the 320th Medical Regiment.

DR. RAY M. BALYEAT, Oklahoma City, was elected president of the American Society for the study of allergy. This meeting was held at Portland, Oregon.

DR. and MRS. CLAUDE S. CHAMBERS, Seminole, left the latter part of July for Rochester, Minn., where Dr. Chambers will attend clinics for a month at the Mayo Clinic.

LINCOLN COUNTY MEDICAL SOCIETY were the guests of Dr. F. C. Brown, Sparks, July 3rd, at the Masonic Hall. A miscellaneous program was rendered and various important matters were discussed.

HARMON COUNTY MEDICAL SOCIETY elected the following officers at a meeting held in Hollis, July 16th, their first meeting since organizing: Drs. J. E. Jones, Hollis, president; W. T. Ray, Gould, vice-president; and Russell Lynch, Hollis, secretary-treasurer Dr. W. T. Ray gave the principal talk of the evening, "Specifics and Emergencies."

THE FOLLOWING OFFICERS were elected 1929-1930 at the American Medical Association at Portland, July, 1929:

President-Elect—William Gerry Morgan, Washington, D. C.

Vice President—Earnest A. Sommer, Portland, Oregon.

Secretary—Olin West, Chicago, Ill.

Treasurer—Austin A. Hayden, Chicago, Ill.

Speaker of the House of Delegates—Frederick C. Warnshuis, Grand Rapids, Mich.

Vice Speaker of the House of Delegates—Albert E. Bulson, Fort Wayne, Ind.

Board of Trustees—Term expires 1934: D. Chester Brown, Danbury, Conn., Allen H. Bunce, Atlanta, Ga.

Judicial Council—James B. Herrick, Chicago, Ill.

Council on Medical Education and Hospitals—M. W. Ireland, Washington, D. C., and James S. McLester, Birmingham, Ala.

Council on Scientific Assembly—L. H. McKinney, Colorado Springs, Colo.

WASHINGTON COUNTY MEDICAL NEWS

DR. and MRS. F. C. REWERTS have returned from a two weeks' vacation in Colorado.

DR. and MRS. O. I. GREEN are the proud parents of a baby daughter born August 8.

DR. F. S. ETTER and family spent a two weeks' vacation with his father in central Missouri.

DR. H. G. CRAWFORD recently returned from several weeks of post-graduate work in New York.

DR. C. K. TILLISON, of Ramona, has been critically ill with hemiplegia for several months.

DR. J. L. REYNOLDS, Tulsa, announces his removal from 812 Medical Arts Building to 723 Mayo Building.

DR. H. C. WEBER and wife have just returned from a months motor trip to Kentucky, Indiana, and Pennsylvania.

DR. J. P. TORREY expects to spend part of August and September visiting in Massachusetts and other eastern points.

DR. ELIZABETH M. CHAMBERLIN recently returned from post-graduate studies in laboratory work in Baltimore and New York.

DR. SHERWELL G. WEBER has been doing post-graduate work in New York and will return to Bartlesville about September 1st.

DR. E. E. BEECHWOOD is spending several months in New York doing post-graduate work. Mrs. Beechwood is visiting relatives in Oklahoma City during the Doctor's absence.

OTTAWA COUNTY MEDICAL NEWS

DR. J. T. MOON, Miami, spent two weeks at the Mayo Clinic, at Rochester, Minn., the latter part of May.

DR. M. M. DeARMAN spent several days at Wellington, Texas, on professional business, the first of July.

DR. GEORGE A. DeTAR and MRS. EFFIE BOYD, both of Miami, were married at Parsons, Kansas, June 1st.

DR. L. W. TROUT and family, Afton, left Monday to spend a month at his old home in Tennessee. The Doctor is making the trip by auto.

DR. J. W. CRAIG, Miami, spent the first week of June in Chicago, attending the National Convention of the Modern Woodmen, and looking over the X-ray clinics.

DR. and MRS. R. F. CANNON, Miami, spent the month of June in an auto tour of the Northwest. The Doctor on his return spent several days at Rochester at the Mayo Clinic.

DR. BURLEIGH DeTAR, who has been located in Miami for the past four years, has opened an office in Joplin, Missouri—in the Frisco Building, where he will devote his time to general surgery.

DR. G. O. WEBB, who has been an active practitioner at Cardin, for the past 15 years, was recently appointed to the Veteran's Bureau Staff at Knoxville, Tenn., and has removed with his family to that city.

DR. TOM DeARMAN, son of M. M. DeARMAN, Miami, has located in Miami, joining the Miami clinic, July 1st. Dr. Tom recently finished his internship in Oklahoma City, and is a graduate of O. U. Medical Department.

DR. W. A. SIBLEY, Miami, who left about the first of February of this year to take special training in nervous and mental diseases at Washington, D. C., has been put in charge of the Nervous and Mental Department of the Veteran's Bureau at Knoxville, Tenn.

RESOLUTIONS UPON THE DEATH OF DR. W. G. LEMMON

WHEREAS, God moving in a mysterious way His wonders to perform has seen fit to remove from our midst our friend and staff associate, Dr. W. G. Lemmon. Therefore be it

RESOLVED, that, in his passing, our staff has lost one of its most active and consistent members and the hospital a surgeon well worthy of the confidence of all.

WHEREAS, as a member of the Board of Governors, he has done much to build up the standardization of the hospital by his ethical conduct and foresight. Be it

RESOLVED, that we deeply deplore his untimely death, and that a copy of these resolutions be spread upon the staff minute book in commemoration of our respect for the departed. That a copy be sent to the bereaved family, and a copy to the Oklahoma State Medical Association Journal.

St. John's Hospital Staff,
P. N. CHARBONNET, M.D.
President
WADE SISLER, M. D.
Vice-President
C. T. HENDERSHOT, M. D.
Secretary

July 16, 1929.
Tulsa, Oklahoma.

RESOLUTION FOR DR. W. G. LEMMON

WHEREAS, the Almighty has in his infinite wisdom seen fit to remove from among us our esteemed members, Dr. William G. Lemmon and whereas the long and intimate relationship held with him in our local association and on the staff of our hospitals of which he was one of the most enthusiastic workers and whereas the confidence and admiration his patients and associates had for him, therefore,

RESOLVED, that the sudden removal of his life in its prime and during his period of greatest activity, leaves a vacancy that will be realized not only by this society and the association of which he was a member, but by the community at large, and be it further,

RESOLVED, that the deepest sympathy of this association and its members are with the bereaved relatives of the deceased and we express a fervent hope that so great a loss to us all may be revealed for good by Him who doeth all things well, and be it further,

RESOLVED, that a copy of these resolutions be incorporated in the minutes of this organization, a copy printed in the official organ of the State Association and a copy forwarded to the bereaved family.

P. N. CHARBONNET
C. D. F. O'HEARN
F A. GLASS
Tulsa County Medical Society.

UROLOGY and SYPHILOLOGY

Edited by Rex Bolend, B.S., M.D
1010 Medical Arts Building, Oklahoma City

CLIPPINGS FROM THE UROLOGIC AND CUTANEOUS REVIEW

Think of syphilis in headaches for which no other cause can be ascertained.

In limiting diet in nephritics, do not do so at the expense of the patient's strength.

Be extremely careful in distending a diseased bladder while the patient is under an anesthetic.

In gonorrhea with unusually severe symptoms, no treatment is quite so effective as complete rest.

A woman does not hate her husband for contracting gonorrhea but for the way he got it.

If an elderly prostatic complains persistently of pain radiating down the leg, investigate the possibility of carcinoma of the gland.

Just because a kidney is tender and palpable does not necessarily mean it is a diseased one. In fact, it may be the patient's only sound one.

Before beginning the use of a bismuth preparation, be sure that it has an adequate bismuth content. This is part of your contract with the patient.

Forget the old axiom that chancres are single and chancroids multiple. Sometimes the one is double and the other single. Besides, this is the day of the dark field.

If you use a one-half per cent solution of novocaine you can practically disregard the quantity injected. It is the degree of concentration which determines danger.

In doing the first stage of a prostatectomy, remember the wisdom of placing the drainage tube in the bladder as far above the pubes as possible. This subjects the peritoneum to the least peril when you take the gland out.

With severe pain in one loin, marked fever, high leucocyte count, flexion and internal rotation of the corresponding leg, direct your investigations toward the possibility of perinephritic abscess.

Whenever a patient with cerebro-spinal syphilis consults you, a heavy responsibility has been imposed upon you. If you will not accept the patient under this condition, refer him elsewhere at once.

During an acute posterior urethritis and prostatitis, if the urine suddenly becomes clear, look out for an epididymitis. Put the patient to bed at once and order an ice-pack over the scrotum.

A higher degree of success in prostatic surgery is assured if you call into counsel a competent internist. The average old prostatic patient needs the services of an internist almost as much as he does those of the urologist. The importance of having an internist work with you in the management of these cases becomes obvious when you remember that the cause of death in many instances is a medical condition.

Chancres of the Erosive Type—Marcial I. Quiroga considers erosive chancres quite exhaustively. These chancres are characterized by adenopathy, severe pain and general constitutional disturbance. There are various types of these chancres: (1) Bland type, which have been treated quite effectively with Dmelcos' vaccine. (2) Definitely luetic chancres, treated by means of specific therapy. (3) Mixed type of chancre, first described by Rollet in 1858, which consists of a mixture of the treponema and bacillus of Ducrey.

Blood Changes in Syphilis During Malaria Therapy—Giovanni Vadala has devoted some time to the study of the blood in luetics who are undergoing treatment with malaria. He has found the following:

(1) During the period of inoculation there is an acceleration of the velocity of sedimentation of the blood, an increase, though slight, of the viscosity, a diminution in the alkalinity, and a lymphocytosis.

(2) During the rise in fever there is a still greater increase in the velocity of sedimentation and a decrease in the viscosity. There is a reduction in the number of red blood cells and hemoglobin content, as well as in the number of leucocytes.

(3) During the period of full activity of the malarial parasites there is a return to the normal values of the blood constituents and sedimentation and viscosity.

Vesical Syphilis—Ubaldo Isnardi discusses the case of a man of 29 who presented himself for examination and treatment. The diagnosis was secondary lues with bladder manifestations. The cystoscope, of course, is the indispensable instrument in the diagnosis of syphilis of the bladder. The mucous membrane of the bladder like the mucus membrane elsewhere in the body, is often subjected to luetic invasion. The lesions are mostly macules. In lues of the bladder the characteristic signs of cystitis are found: tenesmus, pollakiuria and pyuria. There is no appreciable dimunition in bladder capacity. The urine is most often slightly turbid.

Epididymitis Due to the Colon Bacillus—Vintici discusses at length the role of the colon bacillus in the etiology of epididymitis. Sometimes the colon bacillus is the only micro-organism at work, and sometimes it is a secondary invader after the gonococcus has prepared the soil. The two important characteristics of a epididymitis due to the colon bacillus are the cure without further complication, and the frequency of relapses. Even when suppuration occurs, healing will be rapid as soon as the pus is evacuated, and there will be no resultant fistula.

The bacteriological diagnosis is based upon an examination (a) of the urine, and especially a culture, for many cases are not discoverable except by means of a culture; (b) of the fluid drawn from the tunica vaginalis; (c) of the pus in case of suppuration; (d) of the semen and finally (e) of the blood in case there is a suspicion of a septicopyemia.

Vaccine therapy is recommended and especially with an auto vaccine. It is therefore important to make the differential diagnosis.

The Use of Colloidal Iodine in Urological Radiology—Ubaldo Isnardi has given serious thought to the various substances used in X-ray work of the urological system to render the urinary tract opaque to the X-ray. The best results are obtained by using a 28 per cent solution of the colloidal iodine in water. The advantages of this substance over the others are: (1) it is well tolerated; (2) it is soluble in water; (3) it is absolutely harmless, and (4) it is antiseptic and germicidal.

Classification of Various Forms of Bladder Neck Obstructions—In a well presented paper, Frederick E. B. Foley offers the following classification of bladder neck obstructions.

I. Extrinsic Causes.

1. Bladder tumors
2. Vesical calculi
3. Foreign bodies

II. Intrinsic Causes.

A. Disturbances of Innervation—
   1. Central Nervous System:
      a. Functional retention
      b. Diffuse lesions
      c. Localized lesions
   2. Peripheral Nerve Lesions
   3. Atony of Bladder (myoneural?)

B. Anatomic Change—
   1. Inflammatory:
      a. Cystitis vesicae colli (female)
      b. Acute prostatis (male)
      c. Contracture of the vesical neck
      d. Prostatic calculi
   2. Neoplasm and Pseudo-neoplasm of the Prostate:
      a. Benign:
         1. Lateral lobe
         2. Bar
         3. Mid-lobe
         4. Collar
         5. Albarran lobes
      b. Malignant:
         1. Carcinoma
         2. Sarcoma
   3. Hypertrophy of Trigone.

DERMATOLOGY, X-RAY AND RADIUM THERAPY

Edited by C. P. Bondurant, M.D.
417 Medical Arts Building, Oklahoma City

Kraurosis Vulvae. W. P. Graves and George Van S. Smith, J. A. M. A., 92:1244, (April 13) 1929.

This article is an extensive critical review of the literature in an effort to clarify the confusion which has arisen from an unfortunate terminology. The condition begins with an irritative vulvitis, is signalized by pruritus, undergoes superficial epidermal changes in the form of leukoplakia and deeper dermal changes that result in shrinking and retraction, to terminate usually in cancer. The authors urge the use of the term kraurosis, but accept the name leukoplakic vulvitis. They show clinically and histologically that they are both phrases of an identical process. The paper consists of an interesting historic revue, a discussion of the present day significance, a detailed histologic description and a consideration of the treatment. Also there are two photographs and five photomicrographs.

Nine Cases of Erythema Nodosum., R. Hughes Parry and E. Joan Parry, Brit. M. J., 1:498 (March 16) 1929.

The authors of this paper report nine cases of erythema nodosum seen in the same community in the winter of 1926, and in the spring of 1927. In only four of the cases were they able to detect pyrexia. In two cases the nodules preceded the pyrexia, and in the other two the fever had abated before the nodules appeared. There had been a definite attack of acute rheumatism in two cases, and in two others there was a family history of acute rheumatism. Marked relief from pain was obtained from local applications of methyl salicylate in the form of either liniment or ointment. Internal administration of sodium salicylate gave definite beneficial results to those patients who would tolerate the drug. The disease was prolonged in those patients who would not. There was a past history of tuberculosis in the family in only one case.

Metastases in Mammary Carcinoma, F. T. Ingram, Brit. M. J., 1:201 (Feb. 2) 1929.

The author reports a case of scirrhous carcinoma of the breast with metastases to the nail fold of the left middle finger. Six months after removal there was no sign of any recurrence in the breast, axilla or anywhere else. A few days later, however, the patient complained of severe headache round about what looked like a suppurating wen in the right parietal region. This turned out to be a hard, soiled and not very vascular mass, moving freely with the scalp, and certainly not a wen. Since then she has had almost continuous headache with intermittent attacks of vomiting. Neither the thorax nor the abdomen show any abnormality.

A Contribution to the Study of Carcinoma Arising on Lupus Vulgaris, W. J. Mrongovius, Ann. de dermat. et syph., 10:186 (Feb.) 1929.

In 200 cases this author has seen the development of carcinoma in lupus vulgaris in only two cases. Other authors report it in from 1.6 to 4 per cent of their cases. Roentgenotherapy has been suggested as a possible factor in the malignant change, but in only twenty-three of the eighthy-five cases collected by the author from the literature, has this treatment been given. Such factors as the long continued destructive treatment usually employed and the residual infection often seen in an apparently completely healed cicatrix may account for the relative frequency of malignant change in lupus. Also, it has been shown that the lupus cicatrix contains masses of enclosed epithelial cells, and it is probably that cancer originates in one or more of these imprisoned masses. In one case which the author reported in some detail, the patient had a malignant ulcer of the upper lip. This part was the site of active lupus vulgaris, which had been healed in adjacent areas by roentgen treatment. The author apparently absolves the roentgen rays from blame for the malignant change in this case.

Roentgen Treatment for Acute Cervical Lymphadenitis, L. C. Rosenberg, Am. J. Dis. Child, 37: 529 (March) 1929.

Rosenberg has treated eighty patients with acute cervical lymphadenitis with roentgen irradiation. The cases all occurred in children under 7 years of age, and the disease was secondary to infections of the upper respiratory tract. These cases were not due to carious teeth, buccal infection, eczema, infections of the scalp, tuberculosis of the glands, retropharyngeal abscess, or infectious mononucleosis. Invariably the inflammation occurred in the superior deep cervical nodes. All cases selected for this series were considered potentially suppurative, mild cases being excluded. Reliance was placed on irradiation as the sole therapeutic measure, no auxiliary treatment of any kind being used. Suppuration developed in twelve patients; in the remaining sixty-eight patints, or 85 per cent, the inflammation subsided completely without surgical intervention. The author asserts that every patient with acute cer-

vical lymphadenitis and a high temperature should be treated by roentgen irradiation by which everything is to be gained and nothing to be lost. In no case was an unfavorable effect reported.

Role of Roentgen Rays in Pathogenesis of Cancerous Degeneration of Lupus, W. J. Mrongovius, Ann. de dermat. et. syph., 10-186 (Feb.) 1929.

This author thinks that the role attributed to roentgen rays in the pathogenesis of the cancerous degeneration of lupus has been exaggerated. There were only twenty-three patients among eighty-five seen by him who had previously been treated by roentgen rays, and the irradiation had been given from six to fifty years before the beginning of the cancer; most of the patients had been previously treated with Finsen light, pyrogallol and resorcin. The frequency of this type of degeneration depends probably on the nature of the cicatrix of the healed lupus, in which there were found not only superficial but even deeply situated areas of proliferated epithelium.

Causes of Pruritus Vulvae, A. Labhardt, Zentralbl. f. Gynak, 53:197 (Jan.) 1929.

The author recognizes three causes for this disease: (1) symptomatic pruritus in local disturbances of the vulva (vulvitis, maceration by leukorrhea) or in general disease (diabetes, cholemia); (2) ovariogenic pruritus with leukoplakia, and (3) neurogenic and psychogenic pruritus. Labhardt believes that the itching is a consequence of leukoplakia, which often appears alone. Eighteen from among twenty-seven women observed by him were in the climacteric; the remaining nine were hypomenorrheic or oligomenorrheic; only three were normal. Thus it is evident that ovarian hypofunction is closely related to leukoplakia. Among the twenty-seven patients, ten had diabetes.

Summary of Experiences with Tar Cancer and with Cancer in Scars, F. Bang, Hospitalstid. 71:1341 (Dec. 13) 1928.

Bang considers here the relation between the cell and its canceration. He designates the development that a normal cell undergoes to acquire the characteristics of a malignant cell as "increase in virulence". a cell being virulent, i.e., malignant, when by division it becomes able to invade the surrounding tissue. The more often the cell divides, the sooner it attains this abiliy. As the tissue offers a certain resistance to invasion, canceration depends upon (1) sufficient stimulation to cell division and (2) local weakening of the tissue to be invaded. If the resistance is lowered or the half virulent cells are stimulated still further to division, "latent cancer" appears. Nervous influences, age, intercurrent disorders, continued influence of the cancerigenic agent, possibly endogenous influences, are considered as weakening factors, and influences of widely different kinds, including mechanical influences, as irritants to division. Certain local pathologic conditions must play a part in the development of cancer. The number of divisions which the cell must undergo before becoming malignant and the life time of the normal cell are thought to vary with the kind of animal. The local and general predisposition of the individual to cancer then depends on the sum of these and other similar factors. The applicability of these views on the pathogenesis of cancer in explanation of hitherto unexplained phenomena in the cancer theory, such as "acute and latent cancer", carcinosarcomas, and the action of roentgen rays and of radium in both causing and curing cancer, is regarded as a criterion of the tenability of the theory. The differences in the various influences on the tissue which result in the same pathologic process are reconciled by classifying them as influences which (1) stimulate to division and (2) break down the resistance of the cells.

TUBERCULOSIS

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Coexistent Syphilis and Tuberculosis, Adolph L. Gallant, American Review of Tuberculosis, (June) 1929.

This study includes 346 cases of simultaneously occurring syphilis and tuberculosis. 116 cases received treatment for the syphilis and 230 did not. Those treated for syphilis received at least one course of either neoarsphenamin or sulpharsphenamin and a course of mercury inunctions. In the combined infection it is the plan to give reduced dosages of the arsenicals, 1-2 to 1-3 the usual dose.

In an appreciable percentage of cases in which the activity of the tuberculosis is moderate or less there is a marked improvement in the tuberculosis. The best results in this series occurred in the minimal class B cases in which all were improved.

The mortality rate in the untreated was 57 per cent. Those receiving treatment for syphilis, the mortality rate dropped to 21.5 percent.

The Early Diagnosis and Early Care of Pulmonary Tuberculosis. Gerald B. Webb, M.D. Journal of American Medical Association, Vol. 92, No. 22.

The author states that the X-ray is the only method available for the detection of early pulmonary tuberculosis. Early lesions are frequently deep seated and discrete and cannot be detected by physical examination.

When rales can be heard or when hemoptysis, pleurisy or cough occur, the lesion is often advanced.

The earliest lesions are not likely to be accompained by symptoms, and finding no signs, the majority of physicians fail to send their patients in for roentgen examination. "Further progress in eradicating tuberculosis depends to a large degree on routine roentgen examination of all young adults, especially those who have family history of tuberculosis or who have been exposed to the disease."

Auscultation, to elicit changed type of breathing and also rales, should be practiced over the entire chest, first when breathing quietly, then have the patient inhale, exhale and cough at the end of expiration. A carefully taken history is of the greatest importance. Question patient regarding exposure, and especially family contact, lassitude, loss of weight, sweats, frequent colds, hemoptysis of a dram or more, pleurisy with or

without effusion, cough, hoarseness nervousness, indigestion, menstrual irregularities, rectal abscess, and headaches.

The ear, larynx, testicles, eye grounds, anus, abdomen and lymph glands should be examined. Sputum examinations should be done by competant laboratories.

If the diagnosis of pulmonary tuberculosis is made, the patient should be put to bed for an indefinite period, preferably in a sanatorium in the home state. "Rest of body and mind is the only specific remedy yet available for the arrest and the cure of pulmonary tuberculosis. Little difference in the result of sanatorium treatment can be noted in the varying climates of the different states."

Proctective Inoculation Against Tuberculosis with BCG. A. Calmette and Harry Plotz. American Review of Tuberculosis, (June) 1929.

The authors refer to the report of Petroff, Branch and Steenken, concerning their findings on the biological characteristics of a strain of BCG. Petroff and his associates in culturing the organism found two types of colonies, one termed R which is nonvirulent and the other termed S, which is virulent for the guinea pig. Under special conditions they were also able to transform type R into type S and conclude that while BCG strain is only slightly virulent, it may in some instances produce active tuberculosis in the guinea pig and the rabbit. Calmette and Plotz offer as a possible explanation that a spontaneous tuberculosis infection might have occured in guinea pigs raised in a locality where the tubercle bacillus is so widely disseminated. The favorable results of many other investigators is cited and the authors suggest that the BCG vaccine should be estensively employed, especially when we are dealing with infants born and reared in suspected or in tuberculous families.

Method of Vaccination

The bacterial emulsion used as a vaccine should be made from a culture not more than 25 days old in order that it contain the greatest number of living bacteria.

The vaccination should be carried on during the first ten days of life, for it is during this period that the intestine is better able to absorb the bacteria.

Technique

One-half hour before feeding, the infant is given by mouth a dose of one centigram of a fresh culture of BCG, which has been finely emulsified in a liquid which conserves the vitality of the bacilli. This may be given in a small amount of warm milk, repeated twice at 48 hour intervals. The total amount of vaccine taken is 3 cgm. of bacilli.

Exercise in Phthisis. I. Rappaport. American Review of Tuberculosis, (June) 1929.

Exercise of the consumptive is one of the least understood problems of phthisiology.

Hill's investigations have taught us that exercise goes with increasing oxidation processes in the muscles to which respiratory and cardiac hyperfunction provide and transport the necessary oxygen. Glycogen is being broken up into lactic acid, most of which is resynthetised and 1-5 of which is burnt into Co_2 and H_2o. Exercise beyond the capacity of the individual respiratory and cardiac hyperfunction is productive of an oxygen-debt arising from the accumulation of lactic acid in the body, that can not be resynthetised for lack of necessary oxygen. Pomplun showed that the arterial oxygen level of advanced cases of pulmonary tuberculosis is relatively and absolutely lowered. In the far advanced cases an increase of the arterial Co_2 content is also demonstrable. Observations by the author has led him to believe that the cardiac phenomena are only subsidary factors of the pathological process, the main source of which is a genuine respiratory insufficiency. In advanced pulmonary tuberculosis respiratory insufficiency progressing at the rate of pulmonary destruction, eventually leads to anoxemia. Fatigue is the most frequent symptom complained of and is due to lactic acid accumulation, and is the most conspicuous subjective and objective symptom of respiratory insufficiency in exercise. The next symptom is hyperpnoea.

The other clinical phenomena are increased pulse rate, palpitation on the least effort, dyspnea and cyanosis.

A tuberculosis patient should never be permitted to exercise to the point of dyspnea. Fatigue too, must be avoided. Exact pulse rate and respiratory rate determinations, as well as recovery period timing and the gauging of the degrees of cardiac response to effort, holding the breath, etc., are most valuable bedside tests of respiratory efficiency.

Considering all the circunstances we must accept the fact that there is much more to be risked by putting a consumptive on exercise too early than there is by keeping him in bed longer than is needed.

ORTHOPAEDIC SURGERY

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Acute Osteomyelitis in Children. R. B. Wade. Med. J Australia, xvi, 264, Mar. 2, 1929.

"Acute hematogenous osteomyelitis is an infection of the blood stream, of which the inflammation in the bone is the local manifestation."

The initial focus is always in the juxta-epiphyseal region The tisue involved is the bone marrow,—both the yellow marrow of the medullary cavity and the red marrow of the cancellated bone. The deep layer of the periosteum is continuous with the marrow through the canals of the haversian system.

The arrangement of the capillaries in the metaphysis slows the blood current and favors the deposition of emboli. The causative organisms in order of frequency are: staphylococcus aureus, pneumococcus, streptococcus, and staphylococcus albus. The staphylococcus aureus is far the most virulent. In a series of one hundred cases, the disease was more frequent among boys, from ten to fifteen years, and among the poorer classes. The bones involved in order of frequency were: tibia, femur, fibula, humerus, ulna, os calcis, mandible, clavicle, ilium, radius, metatarsal bones, phalanx, astragalus, and scaphoid. The only other parts in-

fected in this series, were endocardium, pericardium, and joints. The case mortality was fifteen per cent., caused by septicaemia, pyaemia, endocarditis, pericarditis, and pneumonia. The causative organism undoubtedly has a specific selective action.

Pus may travel under the periosteum, perforate it, and come to the surface (mild cases); or may involve red marrow and medullary canal (severe cases). It may extend into the joint. Sequestra are usually of dense cortical bone which necroses because of stripping of the periosteum. In infants under three months of age the source of infection is usually the umbilicus, and the causative organisms, the streptococcus or pneumococcus. Commonly there is a septic arthritis. The outlook is usually good, although with hip joint involvement there often follows an ankylosis.

X-ray is of no value in diagnosis until about the fourteenth day. Infection of the neck of the femur is always associated with arthritis of the hip and ultimate ankylosis. When the lower metaphysis is attacked, the knee joint is often involved; as is the ankle joint in infection of the lower tibial metaphysis and the elbow joint in the lower humeral; but upper tibial involvements seldom invade the knee. In the ilium the subperiosteal effusion is usually on the inner surface of the bone and the mortality rate is high. Tarsal osteomyelitis usually involves the neighboring joints.

The progress depends upon the relationship between virulence of infection and individual resistance. A favorable issue can be expected only if pus is produced. Many of the secondary bone infections are of such lessened virulence as to be recovered from without operation. Septicaemic and severely toxic attacks are grave; otherwise the outlook is good, fatality seldom occurring from prolonged suppuration and absorption.

No treatment of the blood stream infection seems of value. The author hopes that the day of "guttering" the whole length of the spongy bone is gone. He feels that a small opening through the cortex at the region of the metaphysis is enough, together with free incision of the periosteum and the removal of that shell of white avascular cortex from which the periosteum has been stripped off by pus, and with removal of sequestra later as needed.

Fracture of the Neck of the Femur in Children. A. Demidow. Orthopedia i Travmatologia, iv-v, 57, 1928.

This was considered a rare occurrence before the advent of the X-ray diagnosis and there is still a question whether epiphyseolysis is not a more frequent affliction. The fracture of the neck in children has a special significance, as very often the diagnosis is not made early and a coxa vara (traumatic) deformity develops.

Among the etiological factors trauma is important, though sometimes overlooked. Rickets, hypoplastic bone atrophy, osteogenesis imperfecta, endocrine changes, and undiscovered foci of osteomyelitis may all be responsible for the fracture. Clinically, certain peculiarities are met with. Often the little patient does not remember the injury, the pain does not last long, and he continues to use his limb. Sometimes there are typical symptoms of fracture with adduction, extension, external rotation, and shortening. Fractures do not often occur before the ossification of the neck is complete. Up to four years of age they are seldom observed. The periosteum suffers little during the injury and supports the nutrition of the fragments as long as the patient does not use his extremity; but as soon as the pain has disappeared and the leg is used again, the periosteum stretches and tears, the circulation is disturbed, and consequently the formation of a normal callus becomes impossible.

The diagnosis of this type of fracture is often difficult; the possibility of a congenital dislocation of the hip, different types of infection, coxa-vara congenita, and other affections must be kept in mind. The author strongly advises a prolonged periodical observation of children with injury to the hip. The treatment in early cases consists of reduction and application of plaster spica for a varying period of time. When non-union is present the usual operative methods are indicated. In untreated cases the author advises the conservative procedures of Prof. Turner, application of a Thomas splint, Lorenz's bloodless reduction, or the usual surgical procedures.

Contribution from Experiments to the Knowledge of the Etiology and Pathogenesis of Deforming Osteo-Arthritis. G. Colle and E. Polacco. Arch. Italiano di Chir. xxi, 193, Apr. 1928.

The authors make a brief review of what has been done experimentally to date, to develop the knowledge of the etiology and of the pathogenesis of deforming osteo-arthritis, after which they report the results of their personal experiments. The rabbit has been the experimental animal used. By means of manual manipulation and it having been determined that the luxation of the hip persisted, the animals were injected in general intravenously, with filtrates of staphylococci with tyndallized bacterial suspension of the same germ and with filtrates or sterilized suspension of Koch's bacillus. The authors give in detail the protocols of the experiments, the results of the anatomic and histological studies and thus report the alterations observed: "Deformity of the articular head of the femur and of the ilium. wearings and erosions of the cartilage and of the bone, without tendency to repair and often filled with new formed connective tissue. Indication of invasion of the articular cartilage by the bone, extra-articular osteophytic formations, ridges and cartilaginous thickenings, especially in the margin, fibrosis of the subschondral medullary spaces, interruptions and functional disorder in the cartilage of growth, cystic cavities in the spongy tissue of the articular heads."

These alterations, according to the experimentors, would be altogether analogous with those to be observed in deforming osteo-arthritis. Since from other experiments performed and already published, it was found that trauma alone or infection alone was not sufficient to produce the anatomical complex observed, the authors conclude that trauma and infection associated provoke experimentally all the alterations of deforming osteo-arthritis. The fact that the infection due to staphlococcus, also that due to the Koch bacillus, have provoked analogous results, demonstrates to the authors that different stimuli may provide identical anatomopathologic alterations.